

EXHIBIT G

California State Lands Commission Presurvey Notice Requirements for Permittees to Conduct Geophysical Survey Activities

All parts of the Presurvey Notice must be adequately filled out and submitted to the CSLC staff a minimum of twenty-one (21) calendar days prior to the proposed survey date to ensure adequate review and approval time for CSLC staff. Note that one or more of the items may require the Permittee to plan well in advance in order to obtain the necessary documentation prior to the Notice due date (e.g., permits from other State or Federal entities). Please use the boxes below to verify that all the required documents are included in the Presurvey Notice. If "No" is checked for any item, please provide an explanation in the space provided. If additional space is needed, please attach separate pages.

Please use the boxes below to verify that all the required documents are included in the Presurvey Notice. If "No" is checked for any item, please provide an explanation in the space provided. If additional space is needed, please attach separate pages.

Yes No

- | | | |
|--------------------------|--------------------------|--|
| X | <input type="checkbox"/> | Geophysical Survey Permit Exhibit F |
| X | <input type="checkbox"/> | Survey Location (including a full-sized navigation chart and GPS coordinates for each proposed track line and turning point)
Explanation: _____ |
| <input type="checkbox"/> | X | Permit(s) or Authorization from other Federal or State agencies (if applicable)
Explanation: <i>Monterey Bay National Sanctuary Permit will not require a permit.</i> |
| X | <input type="checkbox"/> | 21-Day Written Notice of Survey Operations to Statewide Geophysical Coordinator/ |
| X | <input type="checkbox"/> | U.S. Coast Guard Local Notice to Mariners/ |
| X | <input type="checkbox"/> | Harbormaster and Dive Shop Notifications
Explanation: _____ |
| X | <input type="checkbox"/> | Marine Wildlife Contingency Plan
Explanation: _____ |
| X | <input type="checkbox"/> | Oil Spill Contingency Plan
Explanation: _____ |
| X | <input type="checkbox"/> | Verification of California Air Resources Board's Tier 2-Certified Engine Requirement
Explanation: _____ |
| X | <input type="checkbox"/> | Verification of Equipment Service and/or Maintenance (must verify sound output)
Explanation: _____ |
| <input type="checkbox"/> | X | Permit(s) or Authorization from California Department of Fish and Wildlife for surveys in or affecting Marine Protected Area(s) (if applicable).
Explanation: <i>Survey area is not within nearby Soquel Canyon or Portuguese Ledge MPAs.</i> |

NOTE: CSLC staff will also require verification that current biological information was obtained and transmitted as outlined in Section 5 of this permit

EXHIBIT F

PRESURVEY NOTIFICATION FORM

Applicant/Permittee's Mailing Address:

Date: 1/25/2015

George Tate

Jurisdiction: Federal ____ State ____ Both X

USGS Pacific Coastal and Marine Geology

If State: Permit #PRC 8394

400 Natural Bridges Drive

Region: III

Santa Cruz, CA 95060

Area: Monterey Bay, CA

GEOPHYSICAL SURVEY PERMIT

Check one: X New survey Time extension of a previous survey

U.S.G.S. Pacific Coastal and Marine Geology (Applicant/Permittee) will conduct a geophysical survey offshore California in the survey area outlined on the accompanying navigation chart segment. If you foresee potential interference with commercial fishing or other activities, please contact the person(s) listed below:

FEDERAL WATERS (outside 3 nautical miles)

- 1) Applicant's representative:
- 2) Federal representative: (e.g., Bureau of Ocean Energy Management [BOEM] or National Science Foundation [NSF])

NOTE: Any comments regarding potential conflicts in Federal waters must be received by the Applicant's Representative and lead Federal agency within ten (10) days of the receipt of this notice.

STATE WATERS (Inside 3 nautical miles)

- 1) Permittee's representative:
- 2) CSLC representative: Richard Greenwood

NOTE: Any comments regarding potential conflicts in State waters should be received as soon as possible by the Permittee's representative, no more than fifteen (15) days after the receipt of this notice.

1. Expected Date of Operation: February 23-August 14, 2015
2. Hours of Operation: 07:00-17:00
3. Vessel Name: R/V Parke Snavelly
4. Vessel Official Number: USGS-2001279
5. Vessel Radio Call Sign: WZ3374
6. Vessel Captain's Name: Pete Dal Ferro
7. Vessel will monitor Radio Channel(s): 13,16
8. Vessel Navigation System: Differential GPS

9. Equipment to be used:

1. Edgetech Applied Acoustics CSP 700 Mini-Sparker

- a. Frequency (Hz, kHz): 800-850 Hz
- b. Source level: (dB re 1 μ Pa at 1 meter (m) (rms): 202 dB RMS
- c. Number of beams, across track beam width, and along track beam width:
1 beam, omnidirectional
- d. Pulse rate and length: 250-750 milliseconds depending on depth; 350 μ seconds pulse length.
- e. Rise time: 7 μ seconds
- f. Estimated distances to the 190 dB, 180 dB, and 160 dB re 1 uPa (rms) isopleths,
190 dB: 3M; 180 dB: 12M; 160 dB: 135M *
- g. Deployment depth: 1 m
- h. Tow speed: 4.5 knots
- i.. Approximate length of Source tow cable: 30 m
- j. Approximate length of hydrophone streamer: 100 m.

2. Teledyne Reson 7111 Seabat Multibeam Echo Sounder

- a. Frequency (Hz, kHz): 100 kHz
- b. Source level: (dB re 1 μ Pa at 1 meter (m) (rms): 202 dB RMS
- c. Number of beams, across track beam width, and along track beam width:
201 beams, 0.05° along track; 4.5° across track
- d. Pulse rate and length: 50-250 milliseconds depending on depth; 0.08-3.04ms pulse length.
- e. Rise time: 7 μ seconds
- f. Estimated distances to the 190 dB, 180 dB, and 160 dB re 1 uPa (rms) isopleths,
190 dB: 15M; 180 dB: 142M; 160 dB: 200M *
- g. Deployment depth: 2.5 m
- h. Tow speed: 5-8 knots
- i.. Approximate length of Source tow cable: 0 m; vessel pole mounted over the side

*These estimates are based on the underwater sound propagation equation:

$RSPL = SL - 20 \log (R/R_o) - AR$, where

RSPL=received sound potential level

SL= RMS source level re. 1 uPa (rms) based on manufacturer's specifications

R= Distance

R_o = Reference Distance (1 m)

A= sound absorption coefficient

Applicant's Representative:

George Tate
US Geological Survey
400 Natural Bridges Drive
Santa Cruz, CA 95060
831-460-7484

California State Lands Representative:

Richard B. Greenwood
Statewide Geophysical Coordinator
200 Oceangate, 12th Floor
Long Beach, CA 90802-4331
(562) 590-5201

BOEM Representative:

Joan Barminski
Chief, Office of Reservoir & Production
770 Paseo Camarillo
Camarillo, CA 93010
(805) 389-7707

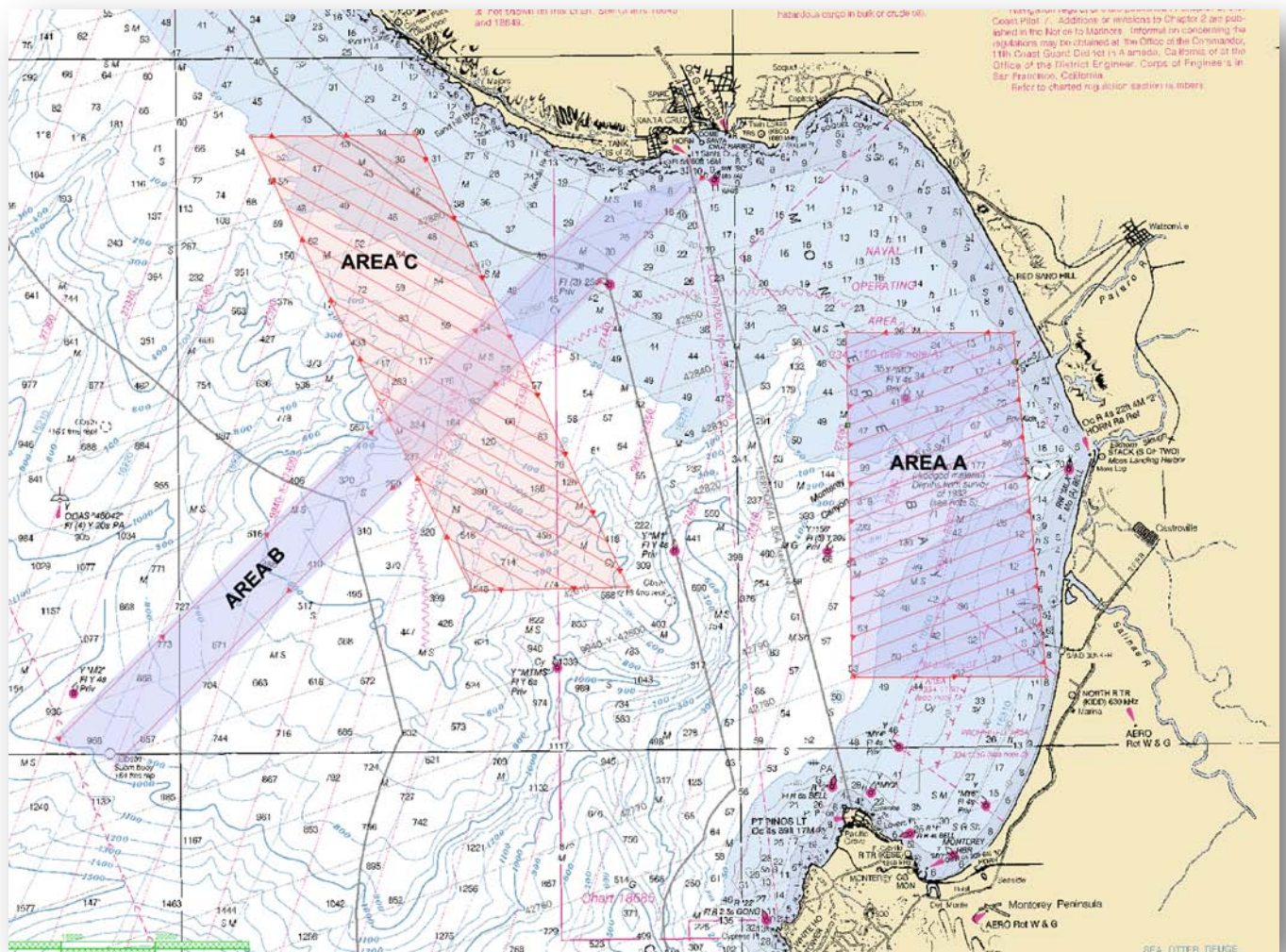
The survey areas are bounded by the coordinates:

Area B	
LAT	LON
36.93806	-122.07535
36.93971	-122.01044
36.65565	-122.36495
36.67815	-122.41461

Area C	
LAT	LON
36.96706	-122.18251
36.74262	-122.06085
36.74120	-122.16132
36.96560	-122.29274

The track line coordinates are:

Line #	SOL		EOL	
	LAT	LON	LAT	LON
B1	36.94119	-122.01793	36.66187	-122.37166
B2	36.67352	-122.40644	36.92862	-122.07772
C1	36.88408	-122.24221	36.82300	-122.11030
C2	36.83717	-122.11842	36.89840	-122.25071
C3	36.80883	-122.10218	36.86976	-122.23372
C4	36.91272	-122.25921	36.85134	-122.12654
C5	36.85544	-122.22522	36.79466	-122.09407
C6	36.86551	-122.13466	36.92704	-122.26771
C7	36.78049	-122.08596	36.84111	-122.21674
C8	36.94136	-122.27622	36.87968	-122.14279
C9	36.82679	-122.20825	36.76631	-122.07785
C10	36.89384	-122.15092	36.95568	-122.28473
C11	36.75214	-122.06975	36.81246	-122.19977
C12	36.96250	-122.27699	36.90801	-122.15905
C13	36.79814	-122.19129	36.74454	-122.07578
C14	36.92218	-122.16719	36.96258	-122.25462
C15	36.74427	-122.09758	36.78381	-122.18282
C16	36.96265	-122.23226	36.93634	-122.17533
C17	36.76949	-122.17434	36.74399	-122.11939
C18	36.95051	-122.18347	36.96272	-122.20990
C19	36.74371	-122.14119	36.75516	-122.16587



**Marine Wildlife Mitigation Plan
Geophysical Studies of Monterey Submarine Canyon and the San Gregorio Fault
Monterey Bay, CA.**

(February 23 - August 22, 2015)

1.0 INTRODUCTION

This marine wildlife mitigation plan is prepared in compliance with the USGS Pacific Coastal and Marine Geology Science Center's existing State Geophysical Permit PRC 8394. This plan is intended to provide guidance to USGS vehicle operators and scientific field personnel collecting geophysical data for the Pacific Coastal and Marine Geology Science Center (PCMG) in Santa Cruz, CA to avoid significant impacts to marine wildlife that may occur during regular geophysical surveys.

1.1 Regulatory Basis

Species that are either currently in danger or soon likely to be in danger of extinction throughout all or a portion of its range are protected by the Endangered Species Act of 1973. The United States Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) implement the Endangered Species Act. During the consultation with NMFS to issue a permit for the offshore geophysical survey, it was determined no incidental take permits are required to use the equipment identified in this document to conduct scientific data acquisition in federal waters offshore of the California coast.

1.2 Geophysical Survey Purpose and Objectives

The USGS Pacific Coastal and Marine Science Center will study the stratigraphy on the Monterey Canyon head to assess submarine landslide processes within the canyon. Recently collected, USGS high-resolution, seismic-reflection data have revealed the presence of shallow, large-scale, nested channel complexes at the head of Monterey Canyon. Most of the channels are presumed to have been cut during Quaternary sea-level low stands (as much as 130 m below present) by erosive, sediment-rich flows emanating from the migrating mouths of the Salinas and Pajaro Rivers. Depth of channel incision (>300 m), channel location, and channel morphology indicates much of the erosion must have occurred below sea level in a submarine-canyon environment. In contrast, most of the channel filling is inferred to have occurred during sea-level high stands when river mouths may not have been directly connected to the head of the paleo-channel and (or) canyon. The Pleistocene paleo-channel and canyon-fill deposits occur along about 12 kilometers of the coast, indicating that the morphology of the head of Monterey Canyon has varied significantly during the Pleistocene - it has clearly shifted numerous times and may have been intermittently much broader than at present. The channel-filling sediments should have lower slope stability than underlying bedrock, and their location along the canyon rim could be an important control on occurrence of intra-canyon landslides.

The above hypothesis of canyon-head evolution is preliminary and based on widely-spaced seismic-reflection profiles collected at highly oblique angles to inferred west-trending river- and canyon-channel axes. For this proposed study, new seismic-reflection data will

be collected perpendicular to the inferred trend of these features at line spacing of 1 km (or less) in Area "A" on Figure 1. This strategically designed survey will provide the data needed to document and more fully understand the stratigraphic architecture of the canyon head, to assess submarine landslide hazards within the canyon head, and to develop and test new hypotheses regarding the formation and evolution of Monterey Canyon.

PCMG will contact the NOAA Long Beach Office staff and local whale-watching operations to acquire information on the current composition and relative abundance of marine wildlife offshore as well as any pinniped haul out sites. Whale activity is moderate at the moment. The peak whale season is February - May in the Monterey Bay. Whale activity in the area has decreased in the past month. At the center of northernmost survey line, the survey area will be no closer than 400 meters of a known pinniped haul out site at Point Santa Cruz. Additionally, one day prior to survey activities, the NOAA Long Beach office, local whale watching operations will be contacted to get an update on marine wildlife sightings in the area. This information will be conveyed to the captain and crew prior to the survey.

A review of environmental responsibility of project operations will be conducted by the chief scientist in charge of the survey operations prior to commencing the first day of operations. When new personnel will be in the crew, this training will be repeated at least for those new to the crew. They will be made aware of their individual responsibility and will be shown how to be aware of possible environmental impacts and how to mitigate them during the geophysical survey operations. Information relating to seasonality, as an indication of the types of animals that might be in our survey area, at the time of survey work will also be presented to the crew. A copy of this document will be provided to the crew of our survey vehicles.

All personnel will be expected to be consistently aware that they are to be alert to any presence of marine wildlife while they are performing their duties. There are a number of signs/indications of marine wildlife presence and each crew member will be responsible to maintain vigilance for those signs within the constraints of their project duties. Some of those indications are:

- a. Sounds - such as splashing, vocalizations (by animals and birds), and blowing (breathing).
- b. Visual indications - birds aggregating, changes in water character such as areas of rippled water, white water caused by splashing, or changes in color or shape of the ocean surface.

1.3 Survey Schedule and Layout

Different methods will be used for the two different studies outline above.

(1) High-resolution, seismic-reflection data will be collected during daylight hours for 6-7 days in Areas A and B (see Figure 1) between February 23 and March 6, 2015. Profiles in Area A will be collected primarily on north-south oriented tracklines (normal to the axis of Monterey Canyon) at spacing of 1 km or less. Profiles in Area B will be collected on northeast-southwest oriented tracklines (normal to the San Gregorio Fault) at spacing of 1 km, extending from the inner shelf to water depths of as much as 2,000 m. These surveys will be conducted on the RV Parke Snively, a 34-foot aluminum-hulled catamaran owned

and operated by USGS. The survey will use the USGS-owned Applied Acoustics minisparker sound source. This minisparker occupies the lowest end of the energy scale for seismic-reflection data acquisition and was included in the joint NSF-USGS Programmatic Environmental Impact Statement (PEIS) as a “low-energy” source producing less than 205 dB re 1 μ Pa-m RMS. For this acoustic source, the USGS estimates that the 180 dB isopleth (nominal Level A harassment according to MMPA) is ~12 m from the source and the 160 dB isopleth (nominal Level B) at ~135 m from the source. This survey will be a "no take" operation, as defined under the NOAA Marine Mammal Protection Act (MMPA) guidelines in that trained, on-board mammal observers will be used to ensure that the sound source is shut down any time a marine mammal is observed within the 160 db safety radius (135 m).

(2) Multibeam mapping will be collected during daylight hours for about 5 days in Area C (see Figure 1) between July 27 and August 15, 2015. The survey will be conducted aboard the RV Parke Snively, a 34-foot aluminum-hulled catamaran owned and operated by USGS. We will be using the USGS Reson SeaBat 7111 multibeam echo sounder, which simultaneously collects bathymetry and acoustic backscatter data suitable for water depths from 3 to 1000 m. This mid-frequency system (100 kHz) is ideal for mapping the continental shelf and upper continental slope offshore of California. It has the acoustic power to efficiently and accurately achieve full bottom coverage across the continental shelf, yet is sufficiently high frequency that the acoustic backscatter retains a wealth of information about the seafloor character which can be exploited by marine geologists for seafloor characterization, habitat analysis, and geologic interpretation. Mapping will be conducted with about 30 percent swath overlap. An Applanix POS/MV will be used to accurately position the vessel during data collection and for vessel motion such as heave, pitch, and roll. Sound velocity measurements will be collected with an Applied Micro Systems, SvPlus 3472 at regular intervals as needed. For this acoustic source, the USGS estimates that the 180 dB isopleth (nominal Level A harassment according to MMPA) is ~42 m from the source and the 160 dB isopleth (nominal Level B) is ~200 m from the source. However, the minimum safety radius specified in the CA SLC MM BIO-3 for multibeam echo sounders is 500m. This survey will also be a "no take" operation, as defined under the NOAA Marine Mammal Protection Act (MMPA) guidelines in that trained, on-board mammal observers will be used to ensure that the sound source is shut down any time a marine mammal is observed within the 500m safety radius.

The regional map of the survey area is shown in Figure 1.

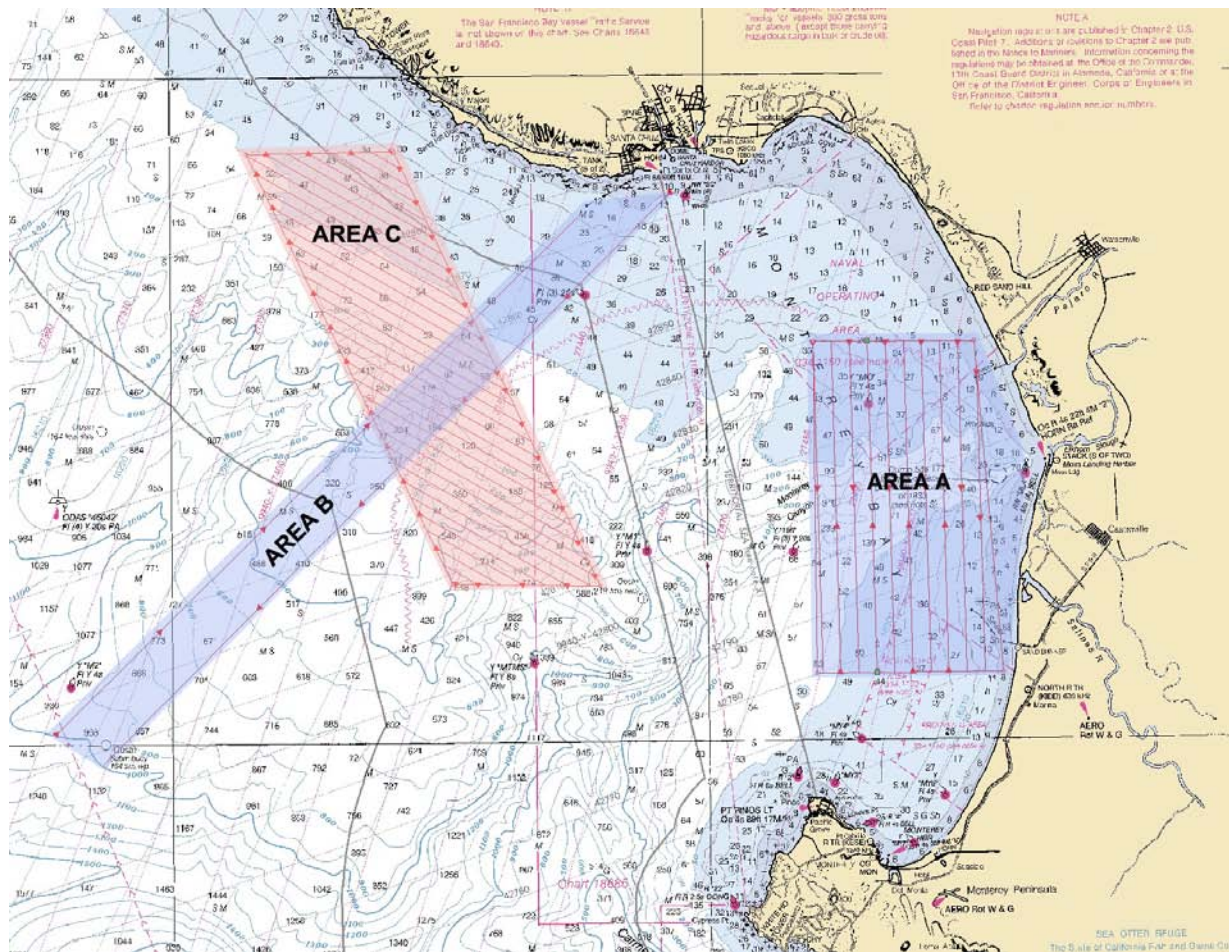


Figure 1. Regional Map of Survey Area

2.0 Survey Equipment and Activities

The survey vessel will be the R/V Parke Snavelly, a 36 foot long, aluminum-hulled catamaran owned and operated by USGS PCMGSC. Only daylight data collection will be conducted with the vessel returning to Santa Cruz harbor daily.

PCMG proposes to use the following equipment to collect the required data:

- Applied Acoustics CSPD-700 Mini Sparker
- Reson 7111 Seabat Multibeam Echo Sounder

The proposed survey will require the use of a marine vessel and in-water equipment that generate noise during data acquisition. The results of modeling of the noise generated by the survey

equipment is shown in Table 1. Those results indicate that the area within which the 160 dB re: 1 μ Pa rms sound level (the level specified by NOAA as potentially harmful to sensitive marine mammals) can be observed by monitors onboard the survey vessel. Because the acoustic data will be collected at an approximate speed of 4.5-5 knots, no area of the seafloor will fall within the sensitive sound level radius for more than about one minute.

Table 1. Distances to Received Pressure Levels from Equipment Sound Source

Sounder System	Frequency (kHz)	Source Level (dB peak)	Source Level (dB rms)	Distance to SL160 dBrms (meters)	Distance to SL 180 dB (rms) (meters)	Distance to SL190 dB (rms) (meters)
Applied Acoustics CSPD-700 Mini Sparker	800-850 Hz	216	202	135	12	3
Reson 7111 Seabat Multibeam Echo Sounder	100 kHz	226	213	200	42	15

These estimates are based on the underwater sound propagation equation:

RSPL= SL-20log (R/Ro)-AR where,

RSPL=Received sound potential level

SL= RMS source level re. 1 uPa (rms) based on manufacturer's specifications

R= Distance

Ro= Reference Distance (1 m)

A= sound absorption coefficient

Although the modeled minimum safety radius for the Reson 7111 multibeam echo sounder is 200m, the minimum safety radius specified in the CA SLC MM BIO-3 for multibeam echo sounders is 500m, and will be considered the "safety zone" for this equipment.

3.0 Marine Wildlife

3.1 Marine Wildlife

The following discusses the marine wildlife that have been recorded within the project region, those taxa that are most likely to be within the project region during the survey, and methods that will be instituted by the vessel operator to reduce or eliminate potential impacts to marine wildlife during transit and survey operations. Assigned Marine Wildlife Observers (MWO), the vessel master and others in the vessel wheelhouse will watch for marine wildlife and will institute the aforementioned mitigations.

Table 2 provides information on the seasonal variations in the marine wildlife that are expected to be or have been reported within the Project area.

Table 2: Abundance Estimates for Marine Mammals and Reptiles of California Unless Otherwise Indicated

Common Name Scientific Name	Population Estimate	Current Population Trend
REPTILES		
Cryptodira		
Olive Ridley turtle <i>Lepidochelys olivacea</i>	1.39 million (Eastern Tropical Pacific)**	Increasing
Green turtle <i>Chelonia mydas</i>	3,319-3,479** (Eastern Pacific Stock)	Increasing
Loggerhead turtle <i>Caretta caretta</i>	1,000 (California)**	Decreasing
Leatherback turtle <i>Dermochelys coriacea</i>	178 (California)**	Decreasing
MAMMALS		
Mysticeti		
California gray whale <i>Eschrichtius robustus</i>	18,017 (Eastern North Pacific Stock)	Fluctuating annually
Fin whale <i>Balaenoptera</i> <i>physalus</i>	2,624 (California/Oregon/Washington Stock)	Increasing off California
Humpback whale <i>Megaptera novaeangliae</i>	1,878 (California/Oregon/Washington Stock)	Increasing
Blue whale <i>Balaenoptera musculus</i>	2,046 (Eastern North Pacific Stock)	Unable to determine
Minke whale <i>Balaenoptera</i> <i>acutorostrata</i>	202 (California/Oregon/Washington Stock)	No long-term trends suggested
Northern right whale <i>Eubalaena japonica</i>	17 (based on photo-identification) (Eastern North Pacific Stock)	No long-term trends suggested
Sei whale <i>Balaenoptera borealis</i>	83 (Eastern North Pacific Stock)	No long-term trends suggested
Odontoceti		
Short-beaked common dolphin <i>Delphinus delphis</i>	343,990 (California/Oregon/Washington Stock)	Unable to determine
Long-beaked common dolphin <i>Delphinus capensis</i>	17,127 (California Stock)	Unable to determine
Dall's porpoise <i>Phocoenoides dalli</i>	32,106 (California/Oregon/Washington Stock)	Unable to determine
Harbor porpoise <i>Phocoena phocoena</i>	1,478 (Morro Bay Stock)	Increasing

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Pacific white-sided dolphin <i>Lagenorhynchus obliquidens</i>	21,406 (California/Oregon/Washington Stock)	No long-term trends suggested
Risso's dolphin <i>Grampus griseus</i>	4,913 (California/Oregon/Washington Stock)	No long-term trends suggested
Short-finned pilot whale <i>Globicephala macrorhynchus</i>	465 (California/Oregon/Washington Stock)	No long-term trends suggested
Bottlenose dolphin <i>Tursiops truncatus</i>	684 (California/Oregon/Washington Offshore Stock)	No long-term trends suggested
	290 (California Coastal Stock)	No long-term trends suggested
Northern right whale dolphin <i>Liissopelphis borealis</i>	6,019 (California/Oregon/Washington Stock)	No long-term trends suggested
Sperm whale <i>Physeter macrocephalus</i>	751 (California/Oregon/Washington Stock)	No long-term trends suggested
Killer whale <i>Orcinus orca</i>	85 (Eastern North Pacific Southern Resident Stock)	Decreasing
	162 (Eastern North Pacific Offshore Stock)	No long-term trends suggested
Pinnipedia		
California sea lion <i>Zalophus californianus</i>	141,842 (U.S. Stock)	Unable to determine; increasing in most recent three year period
Northern fur seal <i>Callorhinus ursinus</i>	5,395 (San Miguel Island Stock)	Increasing
Guadalupe fur seal <i>Arctocephalus townsendi</i>	3,028 (Mexico Stock) Undetermined in California	Increasing
Northern (Steller) sea lion <i>Eumetopias jubatus</i>	2,479 California Stock	Decreasing
Northern elephant seal <i>Mirounga angustirostris</i>	74,913	Increasing
Pacific harbor seal <i>Phoca vitulina richardsi</i>	31,600	Stable
Fissipedia		
Southern sea otter <i>Enhydra lutris nereis</i>	2,711*	Unable to determine

Estimates provided by National Marine Fisheries Service (NOAA Fisheries 2011) *

Estimate provided by USGS (2010)

** Estimates provided by National Marine Fisheries Service (NMFS) (2004), Marquez, et al. (2002), Eguchi et al. (2007), Benson et al. (2007), and NMFS (2007). Estimates are based on number of current numbers of nesting females.

During the transit periods, there is a potential for encountering marine wildlife. Table 3 lists those species that are likely to occur in the survey area

Table 3. Marine Wildlife Species and Most Likely Periods of Occurrence within the Survey Area

Family Common Name	Month of Occurrence ^{<1)}											
	J	F	M	A	M	J	J	A	S	O	N	D
REPTILES												
Cryptodira												
Olive Ridley turtle (T) ⁽²⁾												
Green turtle (T) ^{(1),(2)}												
Loggerhead turtle (T) ⁽²⁾												
Leatherback turtle (E) ⁽²⁾												
MAMMALS												
Mysticeti												
California gray whale												
Blue whale (E)												
Fin whale (E)												
Humpback whale (E)												
Minke whale												
Sei whale (E)												
Northern right whale (E)												
Odontoceti												
Short-beaked common dolphin												
Dall's porpoise												
Harbor porpoise												
Long-beaked common dolphin												
Pacific white-sided dolphin												
Risso's dolphin												
Sperm whale												
Short-finned pilot whale												
Bottlenose dolphin												
Northern right whale dolphin												
Killer whale												
Pinnipedia												
Northern fur seal ⁽³⁾												
California sea lion												
Northern elephant seal ⁽⁴⁾												
Pacific harbor seal												
Guadalupe fur seal (T)												
Steller sea lion												
Fissipedia												
Southern sea otter (T) ⁽⁵⁾												
Relatively uniform distribution		Not expected to occur					Most likely to occur due to seasonal distribution					

(E) Federally listed endangered species.

(T) Federally listed threatened species.

(1) Not Used

(2) Rarely encountered, but may be present year-round. Greatest abundance during July through September.

(3) Only a small percent occur over continental shelf (except near San Miguel rookery, May-November).

(4) Common near land during winter breeding season and spring molting season.

(5) Only nearshore (diving limit 100 feet).

Sources: Bonnell and Dailey (1993), NOAA Fisheries (2011), NCCOS (2007)

4.0 ONBOARD MITIGATIONS

4.1 Fishing Gear Clearance

In addition to submitting the required Notice to Mariners that will advise commercial fishers of pending on-water activities, prior to the start of each survey day the vehicles will traverse the proposed survey corridor for that day to note and record the presence of deployed fishing gear. No survey lines within 30 m (100 ft) of the observed fishing gear will be completed. The survey crew will not remove or relocate any fishing gear; removal or relocation will only be accomplished by the owner or by an authorized CDFG agent.

4.3 Marine Wildlife Monitoring

At all times during survey activities, two to four marine wildlife monitors (MWOs) will be present on the vessel. The onboard MWO shall have the authority to stop operations if a mammal or turtle is observed within the specified safety zone. The MWO will be present at the highest practical vantage point on the vessel and will use binoculars to observe the surrounding area. We will make contact with the NOAA Long Beach office and local whale watching organizations prior to commencement of operations to acquire information on the current composition and abundance of marine wildlife offshore and convey sighting data to the vessel crew and MWOs prior to departure. The certification of MWOs is provided in Appendix A.

The MWO will survey an area at least 200 m in all directions centered on the sparker sound source (towed array behind the vessel), or an area of at least 600m centered on the pole mounted multibeam sound source throughout the period of time that the survey equipment is operating. This visual range will encompass the 135/500 m safe radius distance as specified in the CA SLC MM BIO-3 requirement for this equipment.

If the monitor observes a marine mammal approaching the safety zone, the equipment will be shut down and will be re-started (ramped up) only when the MWO is assured that there is no longer the possibility of marine wildlife entering the safety zone.

The onboard monitors will have the authority to require that operations be stopped if a mammal or turtle is observed approaching the specified safety zone or appears to be negatively affected by the survey activities. The monitors will also have the authority to recommend continuation (or cessation) of operations during periods of limited visibility (i.e. fog) based on the observed abundance of marine wildlife. Periodic reevaluation of weather conditions and reassessment of the continuation/cessation recommendation will be completed by the onboard monitors.

4.3 Mitigations During Transit and Survey

The research vehicles will transit during day-light hours from Santa Cruz harbor. During

transits, there is a potential for encountering marine wildlife and onboard monitoring will be conducted by the MWOs, the vessel master and science crew. During transits the vessel will maintain a minimum distance of 100 m from observed animals. If the vessel master observes a marine mammal within the path of the transiting vessel, they will immediately slow the vessel and/or change course in order to avoid contact.

Cetaceans (whales) vary in their swimming patterns and duration of dives and therefore all shipboard personnel will be watchful as the vehicle crosses the path of a whale or anytime whales are observed in the area.

If whales are observed during transits, the vehicle operator will institute the following measures:

- Maintain a minimum distance of 100 m from sighted whales;
- Do not cross directly in front of or across the path of sighted whales;
- When transit directions is parallel to whale path, maintain constant speed that is not greater than the whales speed, or alter transit direction away from whale path;
- Do not position the vehicle in such a manner to separate female whales from their calves;
- If a whale engages in evasive or defensive action, slow the vehicle and move away from the animal until the animal calms or moves out of the area.

During survey operations, the vehicle will maintain survey a speed of approximately 4-5 knots and will maintain a heading that coincides with survey track lines. If marine wildlife is observed within the vicinity of the vehicle, the vehicle operator will take precautions to avoid collision, ending and restarting the track line survey if necessary.

If a collision with marine wildlife occurs, the vehicle operator will document the conditions under which the accident occurred, including the following:

- Location of the vehicle when the collision occurred (latitude and longitude);
- Date and time;
- Speed and heading of the vehicle;
- Observed conditions (e.g., wind speed and direction, swell height, visibility in miles or kilometers, and presence of rain or fog);
- Species of marine wildlife contacted; and
- Organization, vehicle ID and name of master in charge of the vehicle at time of accident.

In accordance with NOAA requirements, after a collision, the vehicle should stop, if safe to do so. The vehicle may proceed after confirming that it will not further damage the animal by doing so. The vehicle will then communicate by radio or telephone all details to the vehicle's base of operations. The PCMG Marine Operations Superintendent will contact the Stranding Coordinator, NMFS, Southwest Region, Long Beach, to obtain instructions. Alternatively, the vehicle captain may contact the NMFS Stranding Coordinator directly using the marine operator to place the call or directly from an onboard telephone, if available to:

**NOAA Southwest Regional Stranding
Coordinator
National Marine Fisheries Service
501 West Ocean Blvd, Suite 4200
Long Beach, CA 90802-4213
562-980-4017
Contact: Sarah Wilkin
Email: sarah.wilkin@noaa.gov**

It is unlikely that the vehicle will be asked to stand by until NOAA or CDFG personnel arrive, however this will be determined by the Stranding Coordinator. According to the MMPA, the vehicle operator is not allowed to aid injured marine wildlife or recover the carcass unless requested to do so by the NOAA Stranding Coordinator.

Although NOAA has primary responsibility for marine mammals in both state and federal waters, the CDFG will also be advised that an incident has occurred in state waters affecting a protected species. Reports should be communicated to the federal and state agencies listed below:

Federal	State	State
Sarah Wilkin, Stranding Coordinator Southwest Region National Marine Fisheries Service Long Beach, California (562)980-4017	Enforcement Dispatch Desk California Department of Fish and Game Long Beach, California (562)590-5132	California State Lands Commission Environmental Planning and Management Division Sacramento, California (916) 574-0748

4.4 Operational Measures

Operational measures to reduce impacts to marine mammals or turtles will include: 1) soft-start technique, 2) acoustic safety zone radii, 3) slow vessel speeds, 4) avoidance of pinniped haul out sites, and 4) limitations on equipment usage.

a) Soft Start

The soft-start technique will involve initiating the sparker and multibeam echo sounder at the lowest practical sound level, increasing the output in such a manner as to increase in steps not exceeding approximately 6 decibels per 5-minute period. During this time, MWOs will monitor the safety zone for marine mammal or turtle sightings.

b) Safety Zone Monitoring

The safety zone monitoring will follow the protocols outlined in Exhibit H of the Permit (PRC 8394),

which sets a safety zone of 135 m for the sparker system and 500 m for the multibeam echo sounder. In the event that a pinniped haul out site is located within 300 m of the survey boundary, USGS will take the following measures:

- Not approach within 300 m of the haul-out site (consistent with NMFS guidelines);
- Expedite survey activity in this area in order to minimize the potential for disturbance of pinnipeds on land;
- Have the MWM monitor pinniped activity onshore as the vessel approaches, observing and reporting on the number of pinnipeds potentially disturbed;

The vessel will continuously monitor the daily survey area to ascertain the presence, species and location of any marine wildlife is apparent in the intended survey area. The MWOs and onboard personnel will be watchful as the vessel crosses this path or anytime whales are observed in the area. The vessel operator shall observe the following guidelines:

- Make every effort to maintain distance from sighted marine mammals and other marine wildlife;
- Do not cross directly in front of (perpendicular to) migrating whales or any other marine mammal or turtle;
- When paralleling marine mammals or turtles, the vessel will operate at a constant speed that is not faster than that of the animals;
- Care will be taken to ensure female whales are not separated from their calves; and, if a whale engages in evasive or defensive action, the vessel will reduce speed or stop until the animal calms or moves out of the area.

c) Vessel Speed

Survey speeds for data acquisition will be approximately 4-5 knots for maximum sparker data accuracy and data quality, and 5-8 knots for maximum multibeam accuracy and data quality.

d) Limitations on equipment usage

Limitations on the frequency, pulse length, and pulse rate will be implemented to reduce potential harmful noises. For the sub-bottom profiler, the highest frequency band possible will be used and the shortest possible pulse length and lowest pulse rate (pings per second) will be used. For the sparker, the system will be operated at the lowest power possible that provides sufficient signal for the optimal resolution and data quality.

4.5 Monitoring Reporting

A Post Survey Field Operations and Compliance Report will be submitted to CSLC staff as soon as possible but no more than 30 days after the completion of survey activities.

APPENDIX A: MARINE MAMMAL OBSERVER CERTIFICATIONS

Since 2006, the USGS Pacific Coastal and Marine Science Center (PCMGSC) has provided trained marine mammal observers in support of low power geophysical surveys in California State Waters and Federal Waters under NOAA National Marine Fisheries (NMFS) jurisdictions. These surveys have been conducted under permit authorizations from California State Lands Commission (CSLC) (Permit# PRC 8394) and various NMFS Incidental Harassment Authorizations (IHAs) and Letters of Concurrence. PCMGSC has provided training for 17 of their staff research scientists and science and technical support staff as marine mammal observers (MMO) to support our science programs geophysical surveys and meet our marine mammal mitigation obligations under pursuant to our CSLC and NMFS permit requirements.

The MMO training for our science and technical support staff is provided by Dr. James Harvey, a Professor of Marine Science at MLML and the Interim Director of MLML, and has taught courses on the biology and ecology of marine turtles, birds, and mammals for 22 years. Jim has advised more than 70 graduate students as they obtained their M.S. degree, and has all of the instructional material (handouts, identification manuals, slides, video, etc.) for teaching this workshop.

The training was conducted during a 2 day workshop at Moss Landing Marine Laboratories on the identification of marine mammal species, including handouts, slides, and video. All species of marine mammals in the area of planned USGS activities were discussed, their status and trends, and identifying features that allow species identification, and possibly differentiation between sexes and age classes. The workshop participants were instructed in the “normal” behaviors of marine mammals using visual explanations, slides, and video. A typical data sheet was provided and participants were instructed how they would complete the data form. The rationale for the need for trained observers and importance of the data was emphasized. This training concluded with an observational cruise aboard an MLML vessel on Monterey Bay to observe the marine mammals discussed in the course in their natural setting and receive identification tips and other information in a field setting similar to that which they would expect during science operations.

PCMG Certified Marine Mammal Observers

<u>Observer Name</u>	<u>Staff Position</u>
Ginger Barth	Research Scientist
Jonathan Childs	Research Scientist
Guy Cochrane	Research Scientist
Jamie Conrad	Research Scientist
Theresa Fregoso	Science Support
Steven Hartwell	Science Support
Patrick Hart	Research Scientist
Sam Johnson	Research Scientist
Tom Lorensen	Science Support
Tom Parsons	Research Scientist
Carol Reiss	Science Support

*US Geological Survey - Pacific Coastal and Marine Geology Science Center
Marine Wildlife Mitigation Plan - Monterey Canyon/San Gregorio Fault Study*

<u>Observer Name</u>	<u>Staff Position</u>
Ray Sliter	Science Support
Mike Torresan	Science Support
Peter Triezenberg	Science Support
Steve Watt	Research Scientist
Pete Dal Ferro	Science Support - Vessel Master
Jenny White	Science Support - Vessel Master

**U.S. GEOLOGICAL SURVEY
PACIFIC COASTAL AND MARINE GEOLOGY SCIENCE CENTER**

**MANAGEMENT OF ACCIDENTAL DISCHARGE AND VESSEL INCIDENTS
DURING OFFSHORE GEOPHYSICAL SURVEYS**

1.0 INTRODUCTION

The survey operations will be conducted aboard the USGS Research Vessel Parke Snavelly, a 36 foot aluminum catamaran powered by twin Volvo Penta diesel engines. Because of the vessel's relatively small size, it is anticipated that response to any operational spills will be quickly identified and response will be initiated quickly and efficiently by the vessel master and on board designated vessel crew. At the initiation of each project or project phase, a spill management review will be conducted by the vessel master who is in all cases the responsible authority. Oil spills in United States (U.S.) marine waters shall be reported immediately.

2.0 OPERATIONAL SPILLS

Operational spills might involve one or more of the following substances carried on board the vessel: (i) fuel; (ii) lube oil; (iii) hydraulic oil; or (iv) waste oil. The vessel is equipped with a Buffalo Quick-Response Oil Spill Kit, which includes socks for fast spill containment (three 4" socks), woven polypropylene sheets (15 sheets) for rapid absorption of surface oil and protective gear, protective gloves (1 pair), disposal bag (1), and a set of instructions. This oil spill kit is located in the forward cabin of the vessel. This spill kit is rated to clean up 5 gallons of liquid. All of the liquids (listed below) that could cause a hazardous spill are either in the fuel tank or are located in the aft deck engine maintenance compartment of the vessel. Thus, if a spill occurred, these would be contained in the engine or maintenance compartments or, or if a grounding or instance occurred that punctured the gas tank, this would leak into the water, which is beyond the scope of our cleanup efforts. In the event a spill occurred in the engine compartment, the oil spill kit would be used to contain the hazardous liquids and the bilge would not be emptied until it could be pumped out at a hazardous waste facility. We do not anticipate a spill of greater than 5 gallons.

(i) Fuel:

A spill kit shall be available for use in the event of a spill. If the fuel is spilled on the deck, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel master shall notify the Coast Guard and port facility.

(ii) Lube oil:

A spill kit shall be available for use in the event of a spill. If the oil is spilled on deck or in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel master shall notify the Coast Guard and port facility.

(iii) Hydraulic oil:

A spill kit shall be available for use in the event of a spill. If the oil is spilled on deck or in the machinery space, it shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel master shall notify the Coast Guard and port facility.

(iv) Pipe leakage:

The vessel master shall check the piping and rubber hose daily for leakage. Where leakage is found, it shall be repaired immediately, in the event of leakage, the vessel deck engineer shall secure valve(s) at the appropriate tank before repairing the leak. Spilled fuel on the vessel shall be immediately removed, bagged and disposed of at an appropriate hazardous waste reception facility. In the event of spillage in the water, the vessel master shall notify the Coast Guard and port facility.

3.0 EMPLOYEE TRAINING ON OIL SPILL CONTINGENCY PLAN

Prior to the launching of the vessel for any activities, all captain and crew members on the vessel will have read the Oil Spill Contingency Plan, understand procedures to be implemented in the event of an oil spill, and know where the oil spill kit is located on the vessel.

4.0 VESSEL FUELING

All vessel fueling will be conducted at an approved docking facility. No cross vessel fueling will be performed. Appropriate spill avoidance measures during filling procedures will be observed.

5.0 PRIORITY ACTIONS TO ENSURE PERSONNEL AND VESSEL SAFETY

Safety of vessel personnel and the vessel are paramount. In the event that a crewman's injuries require outside emergency assistance, the PCMG safety officer shall be contacted immediately and emergency personnel contacted. While awaiting emergency assistance, the on board vessel master or qualified vessel crew personnel will render first aid and/or CPR. The nearest emergency medical facilities for this area is:

Dominican Hospital Emergency Department
1555 Soquel Dr, Santa Cruz, CA 95065
(831) 462-7710

6.0 MITIGATING ACTIVITIES

If safety of both the vessel and the personnel has been addressed, the vessel master shall care for the following issues:

- Assessment of the situation and monitoring of all activities as documented evidence.
- Care for further protection of the personnel, use of protective gear, assessment of further risk to health and safety.
- Containment of the spilled material by absorption and safe disposal within leak proof containers of all used material onboard until proper delivery ashore, with due consideration to possible fire risk.
- Decontamination of personnel after finishing the cleanup process.

All personnel shall refer to the MSDS's on board for additional information.

7.0 EMERGENCY CONTACTS FOR STATE AND FEDERAL AGENCIES

Emergency numbers for U.S.C.G. for the San Francisco and Central Coast Areas are:

Pacific SAR Coordinator - Alameda: 510-437-3700

Rescue Coordination Center, Alameda: 510-437-3700

Any oil spill in U.S. marine waters shall be reported immediately to the following state and agencies:

West Coast Oil Spill hot-line	800-OELS-911, <i>or</i>
Department of Fish and Game CalTIP	888-CFG-CALTip
(Californians Turn In Poachers & Polluters)	(888-334-2258). <i>and</i>
U.S. Coast Guard National Response Center	800-424-8802
California Office of Emergency Services (OES)	800-OILS-911 or 800-852-7550.

During the phone call, the following information will be given over the phone.

- a. Name and telephone number of caller.
- b. Spill location
- c. What was spilled (oil, gas, diesel, etc.)
- d. Estimated size of spill
- e. The date & time spill was identified (same day).
- f. Any oiled or threatened wildlife
- g. Source of spill, if known
- h. Activity observed at the spill site

After taking the necessary actions, the spill will be reported in writing to the Governor's Office of Emergency Services on their forms.

Additionally, California Department of Fish and Game certified wildlife rescue/response organizations will be contacted about the spill. In the Southern California area, these include the following contacts:

Oiled Wildlife Care Network
1-877-UCD-OWCN

Animal Advocates
323-651-1336

California Wildlife Center
310-458-9453

South Bay Wildlife Rehab
310-378-9921

**U.S. GEOLOGICAL SURVEY
PACIFIC COASTAL AND MARINE SCIENCE CENTER**

GEOPHYSICAL SOUND SOURCE SYSTEMS MAINTENANCE RECORD

Applied Acoustics CSP-700 Sparker

1.0 Introduction

The USGS Pacific Coastal and Marine Science Center (PCMSC) owns and operates a broad range of geophysical sound sources, seafloor mapping systems, geologic and geotechnical sediment sampling systems, and oceanographic instrument systems. This requires considerable technical and operational support to successfully undertake and complete its field programs. Operational and technical support for these systems is provided by the PCMSC Marine Operations Facility (Marfac) in Santa Cruz, CA. Our Marfac group is staffed by a team of ten ocean engineers, electronics technicians, and marine engineering technicians. They operate, maintain and repair all geophysical and oceanographic systems used to support all of PCMSC's scientific field operations.

The USGS-owned Applied Acoustics CSP-700 Sparker sound source was returned to the manufacturer and was given a thorough checkout and complete electrical test as per manufacturer's recommended procedures on February 20, 2014. All tests were passed and the system was determined to be within specified operational parameters.

These procedures were followed by a full at-sea check of all system parameters in order to confirm system performance meets specs. The CSP-700 Sparker is fully compliant with Applied Acoustics stated capabilities and specifications.



George Tate, Marine Operations Superintendant

1/21/15
Date



APPLIED ACOUSTICS
Underwater Technology

CSP-CSPD-700X/C

Model Type:	CSPD 700
Unit S/N:	2080429
Supply Voltage:	110Vac

This Power Supply, S/N 2080429 was given a thorough checkout and complete Electrical Test as per manufacturer's recommended procedures on Feb. 20, 2014. The equipment passed every test, all voltages are within operational parameters; and is certified to be fully compliant with factory specifications in all aspects of its capabilities. All testing performed by:

NameCarl Schubert

Date 2/20/14

Test Engineer Signature

Carl Schubert

Subsea Technologies Inc

1323 Price Plaza Drive

Katy, Texas 77449

281-398-5600 office

**U.S. GEOLOGICAL SURVEY
PACIFIC COASTAL AND MARINE SCIENCE CENTER**

GEOPHYSICAL SOUND SOURCE SYSTEMS MAINTENANCE RECORD

Reson 7111 Seabat Multibeam Echo Sounder

1.0 Introduction

The USGS Pacific Coastal and Marine Science Center (PCMSC) owns and operates a broad range of geophysical sound sources, seafloor mapping systems, geologic and geotechnical sediment sampling systems, and oceanographic instrument systems. This requires considerable technical and operational support to successfully undertake and complete its field programs. Operational and technical support for these systems is provided by the PCMSC Marine Operations Facility (Marfac) in Santa Cruz, CA. Our Marfac group is staffed by a team of ten ocean engineers, electronics technicians, and marine engineering technicians. They operate, maintain and repair all geophysical and oceanographic systems used to support all of PCMSC's scientific field operations.

The USGS-owned Reson 7111 Seabat Multibeam Echo Sounder was returned to the manufacturer and was given a thorough checkout and complete electrical test as per manufacturer's recommended procedures in November, 2014. All tests were passed and the system was determined to be within specified operational parameters.

These procedures were followed by a full at-sea check of all system parameters in order to confirm system performance meets specs. Reson 7111 Seabat Multibeam Echo Sounder is fully compliant with Reson Instruments' stated capabilities and specifications.



George Tate, Marine Operations Superintendant

1/21/15
Date

Certificate of Conformance

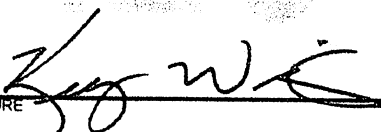
This Teledyne-RESON 7111 Projector meets Manufactures Specifications with regards to Acoustic Output.

TC-2126 MODEL:
7111 Projector S/N:

7111 Projector
0408048

Certified by:

SIGNATURE



Kelly Wright
Service Supervisor

November 11, 2014

Teledyne-RESON, Inc.
100 Lopez Road
Goleta, CA 93117 USA

MM-AIR-1: Engine Tuning, Engine Certification, and Fuels

The following information is provided as required for compliance with Mitigation Measure (MM) AIR-1: *Engine Tuning, Engine Certification, and Engine Fuels*. The USGS Research Vessel Parke Snively is a 36ft., 2007 catamaran work boat. The vessel was built for USGS by Armstrong Marine in Port Angeles, WA and was delivered with two Volvo Penta D6-310 HP diesel engines. These engines comply with IMO NOx limits and the comprehensive emission requirements (EU RCD and US EPA Tier 2, rating 5 Marine Leisure and rating 4 Marine Commercial).

Regarding the NOx emissions, MM AIR-1 states that daily NOx emissions should not exceed 100 pounds based on engine certification emission factors. This can be accomplished with Tier 2 engines if daily fuel use is 585 gallons or less. This vessel only holds 150 gallons and has an efficiency of about 2 miles per gallon. Thus, on our survey, we expect to cover approximately 10-15 miles total, for an estimated maximum fuel consumption of 30 gallons.

The manufacturer's specifications for these engines is provided below.

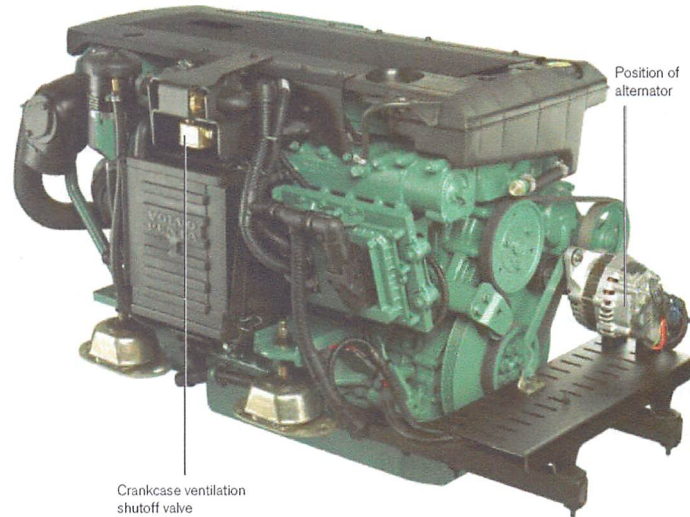
Life- and Rescue Boat Propulsion Engines

D4/D6 SOLAS

132–272 kW (180–370 hp) crankshaft power acc. to ISO 8665

New powerful D4/D6 SOLAS range

Volvo Penta has now introduced a new powerful SOLAS approved range for use in fast rescue boats, lifeboats and tender boats: the D4-180, D4-225, D4-260, D6-280, D6-310, D6-330, and D6-370 common rail marine diesel engines with rating 4 and 5 power settings. The engines are SOLAS approved for both inboard, waterjet and sterndrive propulsion.



Designed to withstand the tough Life- and Rescue boat environment

The D4/D6 Life- and Rescue boat engines are designed to comply with the requirements in the following regulations and standards:

- Council Directive 96/98/EC, as amended by Commission Directive 2002/75/EC
- SOLAS 74 Convention, as amended, Reg. III/4 and Reg. III/34
- LSA Code
- IMO Resolution MSC. 48(66)
- IMO Res. MSC. 81(70), Part 1, paras. 6.10.2 to 6.10.6 and 6.14.6 to 6.14.8.
- U.S.C.G.

SOLAS specifications

The SOLAS regulations specify the following demands for the engine:

- Withstand free fall of the lifeboat from 3 meters
- Withstand a lateral impact of 3.5 m/s of the lifeboat
- Stop automatically on capsizing and easily restart
- Fuel and lubricating systems shall prevent the loss of fuel and oil during capsizing
- Work submerged in water to the crankshaft centerline
- Work for not less than 5 min. after starting cold with the lifeboat out of the water

- Run properly at an angle of up to 10° trim and an angle of up to 20° list, either way
- Manual starting system or power starting system with two independent sources
- The lifeboat engine shall be designed to limit electromagnetic emissions
- The engine to be started without heater down to –15°C (–30°C with heater)

Standard high performance engines

All SOLAS engines are based on standard engine designs with SOLAS kits mounted and are tested in factory before delivery to boat builders. The major changes are a new position of the existing alternator and a new crankcase ventilation shutoff valve.

The design will extend the engine by approx. 270 mm in fore end to accommodate the new position of the alternator. The void space can be used to accommodate the batteries, as usual. See the drawing on page 2 for more information regarding dimensions of the SOLAS kit for D4/D6.

The SOLAS kit also includes a tilt switch, to be mounted on the engine bulkhead.

The base engine mounts are originally designed for high G-forces. Thus, there is no need for extra reinforcement for fast rescue boats and lifeboat applications to meet the SOLAS demands.

EVC for full control in all situations

All engines are equipped with EVC-C, the latest development in engine control and instrumentation for Volvo Penta marine engines, for easy installation and easy handling.

A propulsion package fully matched, tested and supported by one company

The engines and the drives are developed and produced by Volvo Penta, and the service of the engines will be well taken care of by more than 5,000 Volvo Penta commercial and leisure dealers around the world.

Meeting new emission standards

The common rail injection system in combination with electronics and an advanced combustion system are setting new standards in minimizing noxious emissions and particulates. The engines comply with IMO NOx limits and the comprehensive emission requirements EU RCD and US EPA Tier 2 rating 5 Marine Leisure, rating 4 Marine Commercial).

Certificate

The engines will be delivered with a certificate and marked with a wheelmark in accordance with the MED/SOLAS regulations.

**VOLVO
PENTA**

D4/D6 SOLAS

Technical description

For full technical information and performance data for the D4 and D6 engines, please see the product bulletins and technical data sheets for the selected power setting and model of D4 and D6 engine family.

Technical Data

Crankshaft power + dry weight BT inboard

D4-180:

@ 2800 rpm, kW (hp) 132 (180)

kg (lb) 482 (1063)

D4-225:

@ 3500, kW (hp) 165 (225)

kg (lb) 482 (1063)

D4-260:

@ 3500 rpm, kW (hp) 191 (260)

kg (lb) 482 (1063)

D6-280:

@ 3500 rpm, kW (hp) 206 (280)

kg (lb) 580 (1279)

D6-310:

@ 3500 rpm, kW (hp) 228 (310)

kg (lb) 580 (1279)

D6-330:

@ 3500 rpm, kW (hp) 243 (330)

kg (lb) 580 (1279)

D6-370:

@ 3500 rpm, kW (hp) 272 (370)

kg (lb) 580 (1279)

Battery

Minimum requirements for cold start:

- 12V, 1150 CCA for D4 engines
- 12V, 2300 CCA for D6 engines

Cold starting device

2 kW engine coolant heater to be installed for coldstarts below -15°C (down to -30°C)

Reverse gear

- Reverse gear with matched drop center and 8° down angle for compact installation and minimum propeller shaft angle.
- Bevel gears which results in smooth running at all speeds
- Hydraulically operated clutch for smooth shifting
- Electrical shifting performed by electro-magnetic valves
- Seawater-cooled oilcooler

Waterjet

- For selection of waterjet please contact your waterjet dealer.

Sterndrive DPH/DPR

- Complete with transom shield, and installation components
- Max tilt angle 50° (adjustable)
- Protective zinc anodes to prevent corrosion
- Built-in kick-up function to reduce possible damage, in the event the drive strikes an underwater object
- Electrical shifting performed by electronic actuator
- Power Trim with one-button operation in twin installation
- Fully integrated water inlet and exhaust system
- Fully hydraulic power-assisted steering system
- Isolated propellers to prevent corrosion

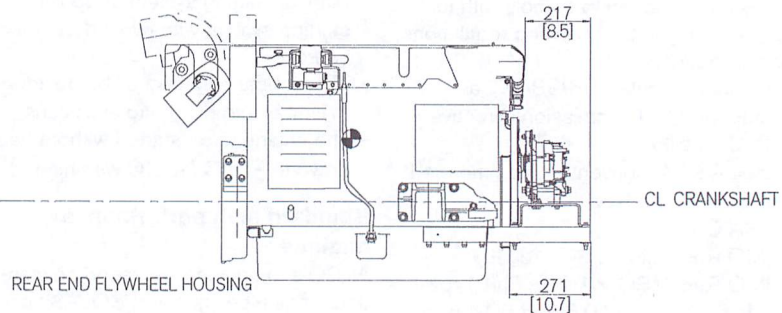
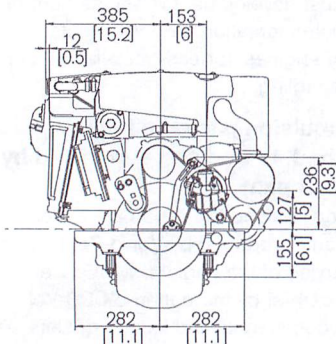
Contact your local Volvo Penta dealer for further information.

Not all models, standard equipment and accessories are available in all countries. All specifications are subject to change without notice.

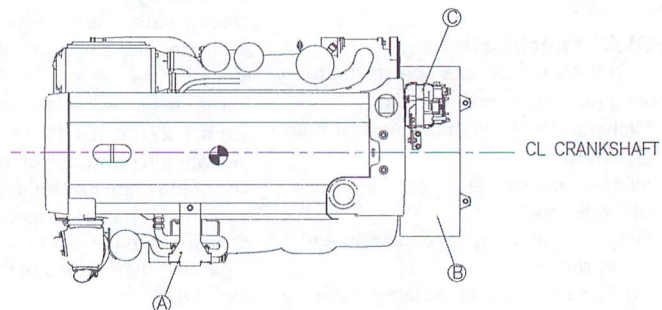
The engine illustrated may not be entirely identical to production standard engines.

Dimensions

Dimensions shown are additional dimensions for SOLAS kit on D4 and D6. Not for installation. For more dimensions, please refer to the respective product bulletin and installation drawing.



- Ⓐ CRANKCASE VENTILATION
- Ⓑ UNIVERSAL BRACKET
- Ⓒ NEW PLACEMENT FOR ALTERNATOR



**VOLVO
PENTA**

AB Volvo Penta
SE-405 08 Göteborg, Sweden
www.volvopenta.com

George Tate

From: George Tate
Sent: Monday, January 26, 2015 10:39 AM
To: George Tate; info@aquariusdivers.com; tascuba@live.com; info@asudoit.com; infomb@sevensesasscuba.com; dive@aquarius2.com; dive@silverprincecharters.com; dave@montereyblue.com; info@mbdcscuba.com; info@montereybaydiving.com
Cc: Greenwood, Richard@SLC; Keen, Kelly@SLC
Subject: RE: Pre-survey Notice of Geophysical Survey Operations on Monterey Bay - Dive Shops
Attachments: CSLC EXHIBIT F - Johnson Monterey Canyon Sparker.pdf

PRE SURVEY NOTIFICATION FOR GEOPHYSICAL SURVEY

The USGS Pacific Coastal and Marine Geology Science Center (PCMGSC) will be conducting a geophysical survey off of Santa Cruz, CA under California State Lands Permit #8394. The operations to be conducted will be a mini-sparer survey using a 150m towed hydrophone array with a tail buoy. The survey will be conducted from February 23 to March 6, 2015. Our vessel is the USGS research vessel Park Snively, a 36 foot aluminum Armstrong catamaran hull vessel. We will be flying day shapes required by the US Coast Guard during survey operations.

In keeping with our California State Lands Permit requirements, we are providing you with the attached Geophysical Presurvey Notice for your information.

Best regards,

George Tate
Deputy Center Director for Operations
Pacific Coastal and Marine Geology
U.S. Geological Survey
Pacific Science Center
400 Natural Bridges Drive, Santa Cruz, CA 95060

831.460.7484 voice
831.421.9209 FAX
831.234.7399 cell

George Tate

From: George Tate
Sent: Monday, January 26, 2015 10:39 AM
To: George Tate; cizenstark@santacruzharbor.org; razzeca@mosslandingharbor.dst.ca.us; mcintyre@mosslandingharbor.dst.ca.us; scheibla@ci.monterey.ca.us
Cc: Greenwood, Richard@SLC; Keen, Kelly@SLC
Subject: RE: Pre-survey Notice of Geophysical Survey Operations on Monterey Bay - Harbor Masters
Attachments: CSLC EXHIBIT F - Johnson Monterey Canyon Sparker.pdf

PRE SURVEY NOTIFICATION FOR GEOPHYSICAL SURVEY

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Best regards,

George Tate
Deputy Center Director for Operations
Pacific Coastal and Marine Geology
U.S. Geological Survey
Pacific Science Center
400 Natural Bridges Drive, Santa Cruz, CA 95060

831.460.7484 voice
831.421.9209 FAX
831.234.7399 cell

George Tate

From: George Tate
Sent: Monday, January 26, 2015 10:39 AM
To: George Tate; slcogpp@slc.ca.org; D11LNM@uscg.mil
Cc: Greenwood, Richard@SLC; Keen, Kelly@SLC
Subject: RE: Pre-survey Notice of Geophysical Survey Operations on Monterey Bay - Geophysical Coordinator and Notice to Mariners
Attachments: CSLC EXHIBIT F - Johnson Monterey Canyon Sparker.pdf

PRE SURVEY NOTIFICATION FOR GEOPHYSICAL SURVEY

The USGS Pacific Coastal and Marine Geology Science Center (PCMGSC) will be conducting a geophysical survey off of Santa Cruz, CA under California State Lands Permit #8394. The operations to be conducted will be a mini-sparer survey using a 150m towed hydrophone array with a tail buoy. The survey will be conducted from February 23 to March 6, 2015. Our vessel is the USGS research vessel Park Snively, a 36 foot aluminum Armstrong catamaran hull vessel. We will be flying day shapes required by the US Coast Guard during survey operations.

In keeping with our California State Lands Permit requirements, we are providing you with the attached Geophysical Presurvey Notice for your information.

Best regards,

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